



# Future Grid Flagship Cluster

University of Sydney

University of Newcastle

University of Queensland

University of NSW

CSIRO Energy Transformed Flagship

[www.futuregrid.org.au](http://www.futuregrid.org.au)

Professor Tony Vassallo

Faculty of Engineering & Information Technology | University of Sydney

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an australian research collaboration



## McKinsey - of 12 disruptive technologies at least 3 are concerned with energy



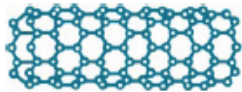
### Energy storage

Devices or systems that store energy for later use, including batteries



### 3D printing

Additive manufacturing techniques to create objects by printing layers of material based on digital models



### Advanced materials

Materials designed to have superior characteristics (e.g., strength, weight, conductivity) or functionality



### Advanced oil and gas exploration and recovery

Exploration and recovery techniques that make extraction of unconventional oil and gas economical



### Renewable energy

Generation of electricity from renewable sources with reduced harmful climate impact

SOURCE: McKinsey Global Institute analysis



# The Future Grid Project

3 year \$13M | 2013-2015

... “for Australia to identify the lowest cost pathway to integrate significant amounts of large and small scale renewables into our grid with existing technologies while maintaining operational stability and security...”

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## P1 – Power & Energy Systems Modelling & Security

Static and dynamic engineering models of the power system that assess the technical feasibility and reliability of possible future energy scenarios

Professor David Hill | Director of Centre for Future Energy Networks  
Professor Tony Vassallo | Delta Electricity Chair in Sustainable Energy Development



## P2 – Grid Planning & Co-Optimisation

Planning of grids with a high-share of renewable generators and co-optimisation of electricity and gas networks where ‘networks of networks’ interact according to long-term changes in generation, load and market.

Professor Zhao Yang (Joe) Dong

Ausgrid Chair & Director for Intelligent Electricity Networks



## P3 – Economic & Investment Models for Future Grids

Power and gas network investment models that use multi-objective optimisation techniques to identify least cost, maximum benefit outcomes from a range of future energy system scenarios.

Professor John Foster, Director & Dr Liam Wagner  
UQ Energy Economics & Management Group



## P4 – Robust Energy Policy Frameworks

Robust policy analysis and development that will encourage market participants to deliver the desired long-term outcomes.

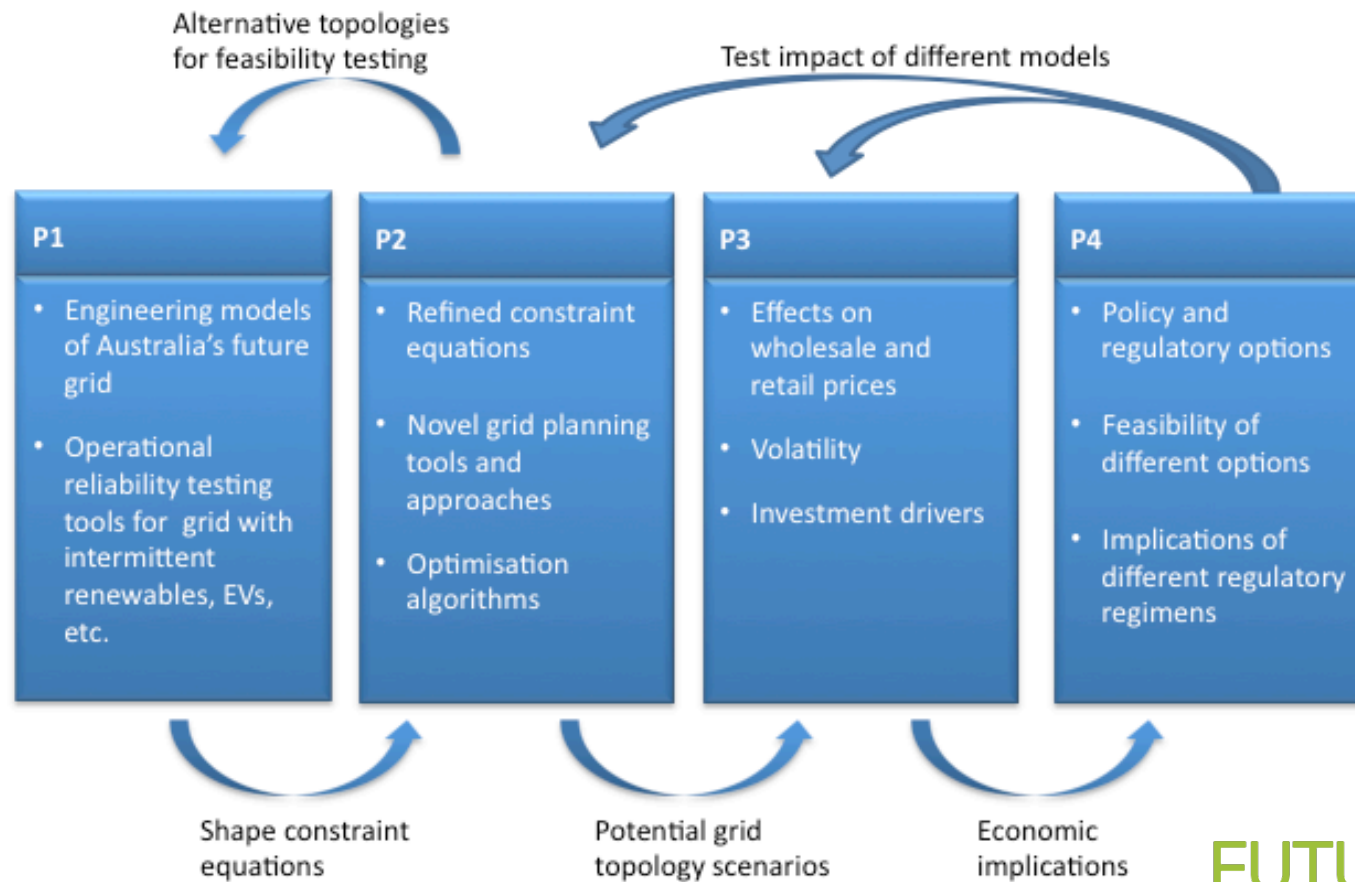
Associate Professor Iain MacGill

Joint Director, Centre for Energy & Environmental Markets



# Strong interdependence across projects

## Future Grid Cluster Deliverables and Linkages







## Thanks to

John Blik, PM Future Grid

Danielle Turner

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Kirsten Lea – CSIRO

Keiren Passmore, Karmele Martin, Faculty of Engineering & IT